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Hawthorne Meadow Feasibility Study

Prepared for:
The Town of Amherst office of Conservation and Development

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June 19th 2012

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EXECUTIVE SUMMARY

The Hawthorne Farm, a two-story house with a single story "Ell" extension to the east and with a large barn, is located at 235 East Pleasant Street in Amherst, and has been farmed with diminishing intensity on the site for the past 180 years. The Town has purchased the property and has committed the buildings to conversion to affordable housing. It has, however, become apparent that the farmhouse is of some historic value and the Town has commissioned this study to assess options and to evaluate premiums for making these conversions with deference to the historic value of the buildings.

There are no building code or town zoning requirements that represent significant obstacles to conversion. There are wetlands immediately adjacent with part of the garage and barn being within the 30 ft no-work zone, and much of the barn and house are within the 30-50 ft buffer zone. However, demolition and new construction of a new structure within the no-build and buffer zone is usually acceptable as long as it is contained within the existing footprint.

The upper floor and roof structure of the existing house is sufficient to carry the current required residential loading, but the lower floor and foundation are not. The single story "Ell" is in such bad shape that it would cost more money to save them than to tear them down and build new to better suit the proposed use. Similarly, the existing barn is beyond any practical means of "conversion" — which is the requirement of the Town Zoning that would enable a third unit to be created.

A balanced appraisal between the existing condition of the building and the historic significance of the structure suggests that the best course of action for an historically appropriate renovation of the building for two units of affordable housing would be to focus on preserving the existing frame structure and enclosure of the main portion of the house, and to develop this 2-story 1,620 S.F. structure as a single, 3-bedroom unit and to construct a new, attached 2 or 3-bedroom unit to the east, within the footprints of the existing "ell" and garage.

The bulk of cost premium associated with proceeding with the "historically appropriate" development option is largely the estimated $76,000 cost of selective demolition and preparation for lifting the house to enable removal and replacement of first floor and foundation, and then returning the building to the new base structure. Beyond that, a further $27,900 premium is associated with the renovation of the original structure as a single three bedroom unit because it is16% larger unit area than a typical new unit with the same number of bedrooms.

The estimated $103,900 premium represents a 20% increase over the estimated $517,500 cost of demolishing the existing construction entirely and building a completely new duplex.

Hawthorne Meadow Feasibility Study

INTRODUCTION & BACKGROUND

The Hawthorne Farm, located at 235 East Pleasant Street in Amherst, was farmed with diminishing intensity on the site for the past 180 years. Currently, it is a parcel of approximately 6.76 acres, with a western upland portion of approximately 0.80 acres and an eastern upland portion of approximately 5.5 acres with a transecting wetland completely separating the two. There is a two-story house with a single story "Ell" extension to the east with a large, older barn and a newer, small barn further to the east.

For many years, this small farm grew vegetables and produce and even pastured livestock. The neighborhood became accustomed to a farm stand at the end of the driveway, which sold an assortment of items, including vegetables, fruit and flower arrangements – although, during the latter years of operation, the produce was grown off site in neighboring communities.

For the past five or more years, both the agriculture and the farm stand have ceased operation and, with that cessation, the property's agricultural exemption from wetland regulation was lost and the property is effectively now irredeemably divided into two distinct usable portions.

The Town became interested in the property in association with its longstanding need to expand its inventory of playing fields. The location, adjacent to the Wildwood Elementary School and Regional Middle School, and its general proximity to the Town Center made the site highly attractive. The eastern portion of the property was identified as being well suited to the recreational need – not least because of the established access and the immediate adjacency of parking associated with the school properties. This was a real advantage, because it meant that the site could be developed for recreational purposes without the need for additional parking, typically an expensive component when developing a recreational facility.

The Town of Amherst Leisure Services & Supplementary Education (LSSE) Commission developed a plan and an application to secure site purchase funding through the Town Community Preservation Act (CPA) Committee. In the process, it was determined that the farmhouse on the noncontiguous 0.80 acre western upland portion of the property would be more appropriately dedicated to affordable housing rather than an auxiliary recreational use.

On May 12, 2010, Amherst's Annual Town Meeting approved the purchase of the Hawthorne property with an almost unanimous vote

and specifically conditioning the western portion of the site be designated for affordable housing for those earning 80% or less of the Area Median Income (AMI).

During the ensuing public process convened to further define the uses of the property under the CPA legislation, there were few comments and suggestions regarding the affordable housing component. But those that were made advocated preserving the house if possible and limiting the size and number of affordable units on the property so that the existing streetscape was maintained. Local residents advocated that new housing be built to the size, scale and style that would blend with the neighborhood. In terms of preservation of the house and barn, surrounding residents appeared more concerned with preserving the historic form and pattern of the buildings on the site than specifically reusing the existing buildings for housing.

The former Housing Partnership / Fair Housing Committee strongly supported affordable family housing for the property. The site's location in the Town center and its proximity to the schools, parks and other services make it an ideal location for this type of housing.

To advance the process, the Town commissioned this feasibility study to examine and report on the best approach to developing the affordable housing. Specifically, this study report is:

1. Further examining the value of the building's historic significance, and reporting on code and other regulatory agency requirements involved in re-purposing the existing buildings for affordable housing.
2. Determining needed modifications to convert the existing buildings to affordable dwellings.
3. Recommending and providing construction cost estimates for four redevelopment options.

REQUIREMENTS FOR AFFORDABLE HOUSING

Town of Amherst housing unit requirements:

According to zoning, a two-family and a converted dwelling (the barn if feasible) is allowed by special permit. Apartments and townhouses are not allowed.

Accordingly, if feasible and practical, the Town has committed to securing three, three-bedroom units of affordable housing on the western upland (East Pleasant Street fronting) portion of the site. To the extent that the housing is organized in a massing arrangement that follows that of the existing buildings — either as a renovation of those existing, or new construction over the existing footprints — this would resolve as a two-family duplexed dwelling in (or in place of) the existing farmhouse and a single family unit in (or in place of) the existing barn.

Requirements for Building and Access Code compliance:

Massachusetts One and Two Family Building Code 780 CMR (IRC 2009 with Amendments):
The following are the sections of this regulatory structure that will impact conceptual design determinations at the scale relevant to this feasibility study:

Article R301; Structural Design Criteria —see structural engineer's report.

Article R302; Fire Resistant Construction — "Dwelling units in two family dwellings shall be separated from each other by wall and/or floor assemblies of not less than one hour fire resistance". This typically involves an unbroken sheathing of fire code Type X gypsum wall board from basement slab to the underside of roof and exterior wall sheathing. It always involves the fire caulking and various other protections of penetrations through this fire separation barrier. Additionally, the structural components of the building that are supporting these fire separation assemblies must be equivalently protected all the way to their footings.
NOTE: these ratings can be reduced to a half-hour if a NFPA 13 compliant automatic sprinkler system is installed.

Article R305; Ceiling Height — Ceilings in habitable spaces must be at least 7' 0" clear height. The existing floor-to-ceiling heights in the farmhouse are 7' 6±"

Article R311; Means of Egress —"All dwellings shall be provide with two means of egress". This means that, for a fully second story apartment unit, two stairways must be provided and these must be secured within a one hour rated fire resisting enclosure if they are within the structure, or protected from the weather if they are external.

Architectural Access Board 521 CMR:
Not applicable to one and two family structures.

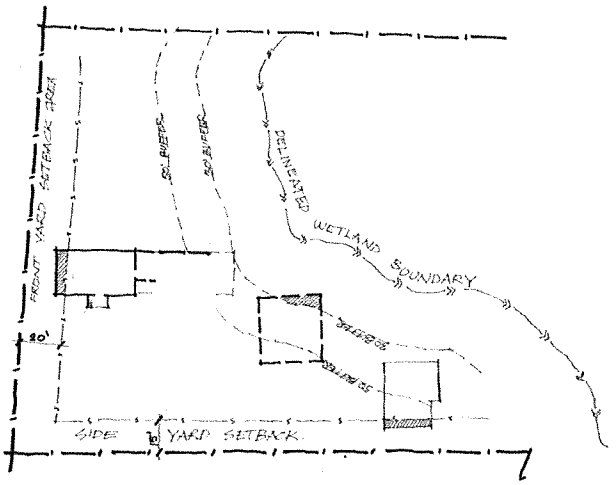
US DoJ 2010 ADA Standards for Accessible Design:
Not applicable to one and two family structures.

Town of Amherst Zoning By-Laws limitations:

The parcel is located in the Neighborhood Residence (RN) zone. The dimensional requirements of this zone are tabulated below, along with the current dimensional data related to this building and parcel.

Dimensional standard	Required in the RN zone	As existing
Basic min. lot size	20,000 sq. ft.	36,000 ± (western upland)
Additional for additional unit (Requires approval of a Special Permit from the Zoning Board of Appeals)	6,000 sq. ft.	
Required frontage	120 feet	206 feet
Front setback	20 feet	14 to 17 feet
Side and rear setback	15 feet	Greater than 15 feet except for small barn (which is 10 feet)
Max. building coverage	20 %	Less than 20%
Max. lot coverage	30 %	Less than 30%
Max. number of floors/stories	Three (3)	Two stories
Max. building height	35 feet	Less than 36 feet
On-site parking requirement for a dwelling unit	Two (2) spaces per D.U. — though this can be varied at the discretion of the reviewing Board	There is sufficient space to accommodate this requirement for up to three D.U.s

In order to create a two-family dwelling in this RN zone it would be necessary to secure a Special Permit from the Zoning Board of Appeals. The minimum dimensional requirements (as tabulated above) for such a creation appear to exist, and East Pleasant Street is certainly a "heavily travelled street" — which has historically been a consideration in a favorable finding by the ZBA. Additionally, the Design Review Board standards (Article 3.204 of the Zoning By-Law) are applied by the Board in making its determination.



The site plan above (traced from the Town of Amherst GIS) shows the wetland and setback boundary transgressions. It shows both the 50 and 30 foot buffer boundaries.

Barn Conversion

The Amherst Zoning By-Law allows for a "Barn conversion" to a dwelling unit. In response to an enquiry about the restrictions on conversion of the large barn, Planning Director Jonathan Tucker referenced the zoning bylaw, which indicates that a structure remain in place and cannot be demolished as part of the conversion process. Section 3.3241 Converted Dwelling, Sub-paragraph 4 further explains:

> *4. There shall be no significant change in the exterior of the building, except that the Zoning Board of Appeals may authorize modification or alteration of a building if such modification or alteration does not substantially change the building's character or its effect on the neighborhood or on property in the vicinity. Demolition of the existing structure proposed for conversion shall not be permitted.*

Given the utter state of disrepair of the existing barn, this suggests that the "barn conversion" route is not available for permitting a third dwelling unit.

Another theoretical route is to create a second parcel by division. The 206 ft. frontage does not support a second frontage lot (that would require 2 x 120 = 240 ft.). It is possible to create the second lot as a flag lot, but the required upland acreage would necessitate taking land from the eastern side of the transecting wetland, and this (we understand) is in violation of the terms of the Town Meeting approved purchase agreement.

EXISTING CONDITIONS REPORT — SITE

Site and Wetlands:

As can be seen from wetlands map of the property, part of the garage and barn are within the 30 ft no-work zone, while much of the barn and house are within the 30-50 ft buffer zone, and therefore any work on the house and barn is clearly under the jurisdiction of the Conservation Commission, and would require a Notice of Intent (NOI) (A NOI would be required even if the buildings were within a 100 ft. of the wetland boundary)
It is common practice to allow the demolition and new construction of a new structure within the no-build and buffer zone as long as it is in the same footprint. An expansion of the footprint toward the wetland could result in a denial by the Conservation Commission or a request for some type of mitigation. Demolition of the existing non-conforming building and constructing new further from the wetland (i.e. south of the existing house), but even still in the buffer zone, would presumably be seen as favorable by the Conservation Commission.

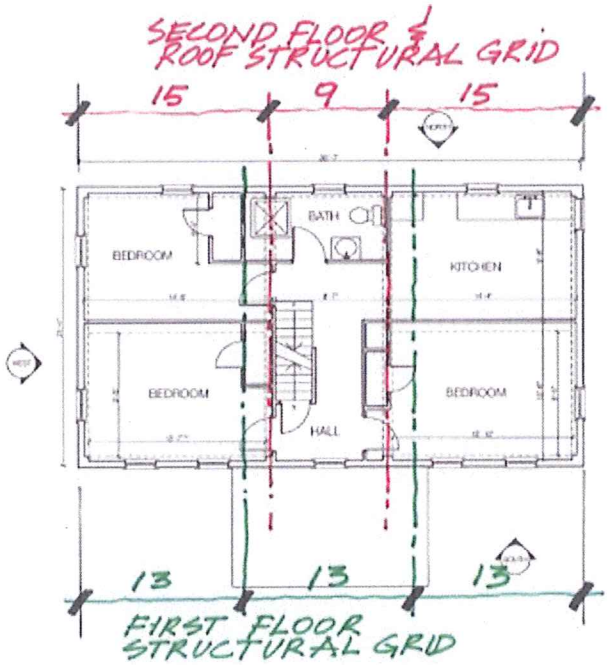
Trees and vegetation:

The Town of Amherst Tree Warden agrees with the tree inventory that the two street trees along East Pleasant Street to the south of the house can be removed.
The large maple tree near the driveway, across from the main entrance, has some dead wood and other small defects, but looks structurally sound and in good condition. It would have to be removed for any solar installation on the house. The two maple trees close to the edge of the property near the horse paddock are healthy and structurally sound with good branch unions. The clump of red maples near the driveway across from the "ell" can be removed.

EXISTING CONDITIONS REPORT — HOUSE

Building Foundation and Structure: (This section of the report is extracted from a report by Ryan Hellwig PE, the full text of which has been included as Appendix B)

The main house is an old timber-framed structure. The roof frame is fully visible in the attic. It is divided into three unequal bays of about 15 ft + 9 ft. + 15 ft., each delineated by two interior sets of 5x7 principal rafters, which support purlins, which in turn support the rafters. The 2nd floor frame has the same 15-9-15 layout as the roof. There are no interior posts for the frame.



The rafters are generally in good condition. They are relatively small in section, but the spans are short. The ends of the purlins have been cut down severely to form tenons that fit into mortises in the principal rafters. This creates a notch effect in the purlins, weakening the ends. At least two purlin ends have failed at the notch.

The common rafters have short enough spans so their stress would not be excessive under snow loading. The purlins and the principal rafters carry much greater loads, and their stresses and deflections are greater. This combined with the failed purlin ends, explains the visible sagging in the roof. Some reinforcement of the purlins and the principal rafters would be required.

What is visible in the second floor frame is generally in good condition. The second floor joists are also relatively small, but also have short spans. The capacity of the carrying beams is slightly less, but the whole floor is capable of supporting a 2nd floor residential live load overall. Because the interior partitions are under but off-center from the girders, the latter have rolled at the joint with the beams. Posts near mid-span would be necessary, and they would have to be continued down to new footings.

The 1st floor frame is in very poor condition with visible signs of rot everywhere. Some of the joists have been notched severely. The floor dips noticeably in several locations, particularly in the south-west corner, which is presumably due to the rotted sill, and there is a general sag towards the center of the house. The 1st floor layout has three equal bays, so that the interior posts do not line up with the girders above.

The foundation walls are a mix of brick and granite. It is difficult to tell exactly what is original. There are signs that the basement may have been originally shallower, and may have been dug down at some time in the past. It appears that concrete was poured against the original foundation walls, which may have been a combination of brick and granite slabs. In some areas soils are visible behind that base of the concrete, and in one location the footing seemed to be visible a couple of feet above the floor. The brick walls are bowing and bulging throughout.

Neither the first floor structure nor the existing foundation wall is able to safely carry the current required residential loading and neither is sufficiently robust that mere stiffening and underpinning are feasible. They both should be replaced.

The garage and 'Ell" addition are all in such bad shape that it would cost more money to save them than to tear them down and build new to better suit the proposed use.

Building Enclosure:

The building enclosure is substantially original with a subsequently super-imposed cladding of asbestos fiber cement shingles. Double hung windows and exterior doors are not original and are in poor condition, as is the painted wood casing trim. The walls are full 2" x 4" studs infilling the historic timber frame bents; there is sawn wide board sheathing to the exterior and lath and plaster to the interior. The wall cavities have (recently) been filled with a dense-packed cellulose

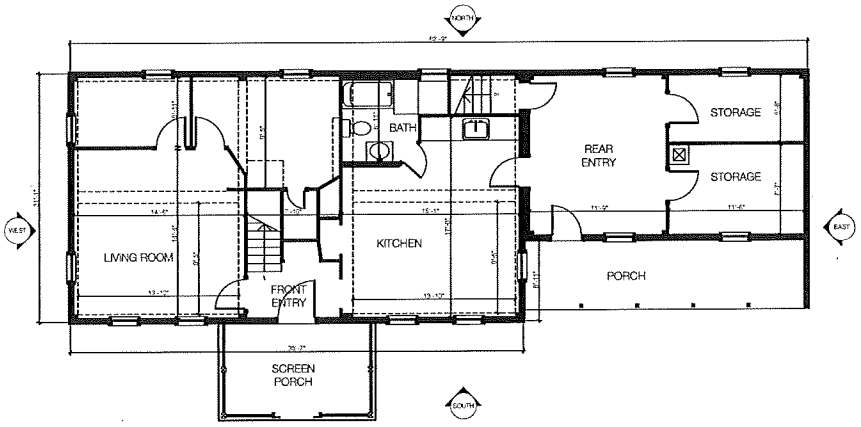
insulation — which appears to have been done well with little or no voided areas (this was determined by visual inspection of two revealed areas and not by use of a thermal imaging camera). The existing roofing— asphalt shingles over the board roof sheathing — is still weather tight, though near the end of it service life. There is no evidence of water entry or damage.
(See Appendix G for a suite of photographs of these existing conditions)

Building Systems:

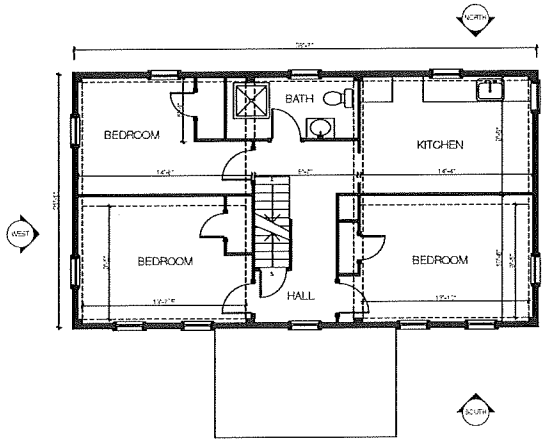
Plumbing fixtures and waste and supply piping, and the oil fired furnace and associated ducting are at the end of the service lives. The 100 Amp electrical service panel and all wiring, receptacles and lighting fixtures are likewise at the end of their service lives.

Historical Significance: (This section of the report is extracted from a report by Bonnie Parsons, the full text of which has been included as Appendix C)

The Hawthorne House has a four-room plan with a straight-run, center stair. A center chimney was removed from the house from basement to the roofline in order to provide the center staircase. The loss of the center chimney and insertion of a straight run stairway is unfortunate for the integrity of the house, as is loss of the main entry door surround.



First floor plan as existing



Second floor plan as existing

The main block of the house is an 18th century building that used a scribe rule, post and beam framing system as evidenced by the flared posts to accommodate English tying joints. This framing system was the earliest to be used in this country by colonists who brought it from England and it is a sure mark of an early house. Square rule framing, which succeeded scribe rule, made its first appearance in 1812 in Goshen in this region so the house could end-date to 1812. Further research has also more closely identified the type of roof framing found at the Hawthorne House as a, "Principal Rafter-Principal Purlin-Common Rafter Roof", considered by Jack Sobon, architect and historic timber framer, as one of the most elaborate roof systems found in historic American timber joinery.

The roof framing system of principal rafters joined by a single purlin row with common rafters lying outside the purlins, and the rather steeply pitched roof dates it to the second half of the 18th century, though examples of this system in Connecticut date as early as 1730. Sheathing boards measuring about 17" in width are vertically laid between rafters. The principal rafters and purlins are hewn, the common rafters are upright mill-sawn. The floor joists's saw marks are those made by a water-powered sawmill equipped with a sash saw. Sash sawmills are thought to have operated as early as 1750 in Leverett at the Joseph Slarrow mill in North Leverett, and were responsible for cutting the timber for framing until about 1850 in the region.

The presence of boxed corner posts, girts, and summer beams in plastered walls and ceilings in the first floor rooms places the house after 1750, as well. The presence of windows in the cellar foundations

suggests a post-Revolution date as Georgian period houses had lower foundations in general.

On the interior the loss of window sashes means that window muntins cannot act as a dating tool, and without extracting nails from the house, using nails to help date is also problematic. A few nailheads visible on the exterior window surrounds appear to be cut nails rather than wrought, but this would only tell us that the window surrounds were erected when cut nails were available in the area sometime between 1750 and 1820. Doors are very simple and do not have moldings that would identify them as from a finely built house, rather from a country Federal.

The "ell" is of later date than the house. It is post and beam constructed but according to square rule, which would place it after 1812. It may indeed have been moved from another location to add on to the house, which would explain some of its repairs. The house is clearly in view on the 1886 Birds-eye-view of Amherst with its ell and a barn.

The New England barn is likely a later 19th, century building, ca.1880-1890. There is not a great deal of distinction among barns from the turn-of-the-century making dating a barn imprecise. It is not in good condition, but is repairable.

The second, smaller barn was probably built in the 1940s-50s, though it could have been later.

While this project does not provide for a full narrative of the house's owners and their occupations, it is clear that the house was in agricultural use from the time of its construction into the mid-20th century. The house has sustained losses due to modernization efforts of the late 19th century, but retains a relatively rare structure that could be expected, with sill repairs, to continue functioning for another two hundred years. It is one of Amherst's Federal period farmhouses and represents farming as it took place for the majority of Amherst's residents between the late 18th and mid-20th centuries.

Presence of Hazardous Materials — fuel oil and asbestos:

The Town of Amherst commissioned an Environmental Site Assessment report (colloquially known as a Phase One 21E report) for the residential portion of the property at 235 East Pleasant Street in Amherst.

In July of 2010, New England Environmental Incorporated (NEE) delivered their report, which included the finding of potential contamination on the ground surface in the vicinity of 275-gallon kerosene above ground storage tank in the gravel portion of the basement under the "Ell" extension. The kerosene was apparently used to fuel the kitchen stove from 1951 through the 1990's, and the spillage is assume to have progressively occurred as the residents decanted the kerosene from the tank via the spigot. NEE recommended that the soil in the vicinity of this tank be analyzed to determine if there has been a release and, if so, recommend its immediate cleanup.

By contrast, the 275-gallon fuel oil storage tank in the concrete-poured floor portion of the basement is reported as in fair to moderate condition, based on the superficial rust observed on the tank. No stains were observed beneath that tank.
Beyond the above, information obtained from Amherst municipal agencies and from the Data Map Technology Corporation report indicates that the site has no formal report of a release of oil or hazardous material contamination.

NEE testing results indicate the presence of asbestos-containing materials at levels greater than 1% within the residence. The exterior house shingles contain asbestos – they are in good condition and could remain in service if they are not disturbed. Any demolition of the building must be undertaken according to the protocols for removal, bagging and disposal of this non-friable asbestos-containing material. Furthermore, linoleum flooring in roughly half of the house contains asbestos at greater than 1%, as does the window caulking on the house & barn windows and the roofing flashing on the house. It was noted that the roofing shingles do not contain asbestos. Again, should the project projected proceed to either demolition or substantial renovation, all asbestos that is identified as being in poor condition should be removed by a licensed asbestos removal contractor according to the applicable regulations.

NEE observed stained soil beneath the kerosene storage tank and collected a soil sample for laboratory analysis. The lab reported concentrations of C9-C18 aliphatic petroleum hydrocarbons at a concentration of 2,620 mg/kg above the reportable condition and Method 1 Cleanup Standard. All other analytes detected were concentrations below reportable concentrations. NEE concludes that soil under this tank is contaminated with petroleum and maybe a reportable condition if the volume is greater than 3 cubic yards.
The Town is considering completing the cleanup of this contamination prior to offering the property for a development RFP.

Presence of Hazardous Materials — lead:

Testing confirmed the existence of high levels of lead in paint samples taken from interior and exterior door frames and from the wide board flooring on the second floor. Testing revealed lead levels in excess of 18,000 parts per million (see Appendix D – Lead testing laboratory report). Massachusetts Department of Public Health 105 CMR 460.020 establishes "dangerous levels" of lead in paint *"shall be deemed to be 600 parts per million or greater as measured by atomic absorption spectrophotometry".*

Therefore lead abatement will be necessary (either by encapsulation or removal) if the existing building is to be habitable by families.

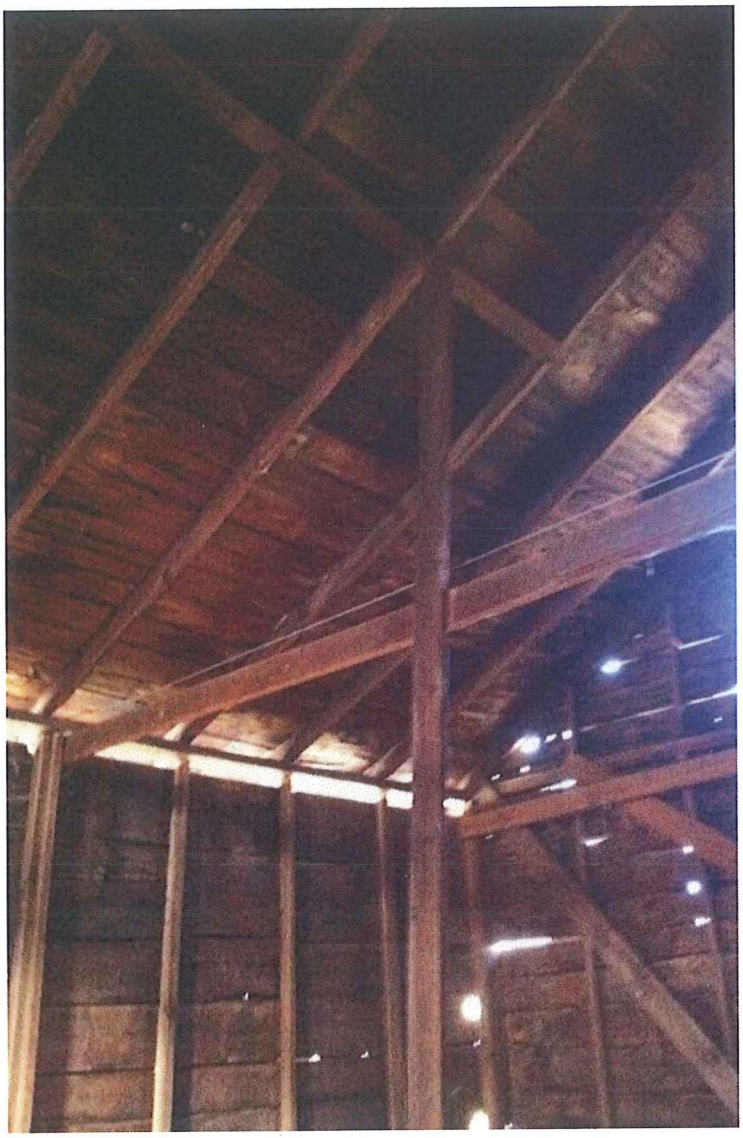
EXISTING CONDITIONS REPORT — BARN

The building sits on a makeshift, 18" deep concrete foundation wall, obviously site-mixed with aggregate that includes large stones and brick bats. In places it has completely fractured; in other places it has been completely undermined. Evidently the whole thing was poured under the existing structure at some point well after the building's original construction as a makeshift underpinning.

A sparse wood framed structure sits on 9"x 9" wood (chestnut?) sills which in turn rest on this absurdly insubstantial foundation wall. The sills have completely rotted at various points around the perimeter — particularly on the non-gable end sides — a condition that has been accelerated by the concrete foundation wall trapping moisture against the wood sill base.

The walls are full height, full dimension 2x4 studs, spaced at approximately 36" O.C. bearing on the 9x9 sill plates and supporting a 2x6 top plate on to which 6x6 rafters are supported. The studs are insubstantially connected to the sill at the bottom and the plate at the top.

Five of the rafters on the north side and four of the rafters on the south side are supported at the 60% point on the north side and at the 75% point on the south side by a 2x4 on the north side on flat purlin, which is supported in turn by 2x6 full height posts, which are intersected by 2x6 collar ties to the stiffened 2x4 studs at the north and south walls. There is no ridge beam. This is the most insubstantially framed barn building of this size that I have ever seen. Except for six 1x8 flat boards nailed diagonally across the inside face of the east wall, there is no diaphragmatic bracing at all. None of the 1x8 boards complete an effective triangulated stiffening. Essentially there is no bracing in the building at all, other than that incidentally achieved from the wide board sheathing on roof and walls over which the exterior clapboard siding is attached.

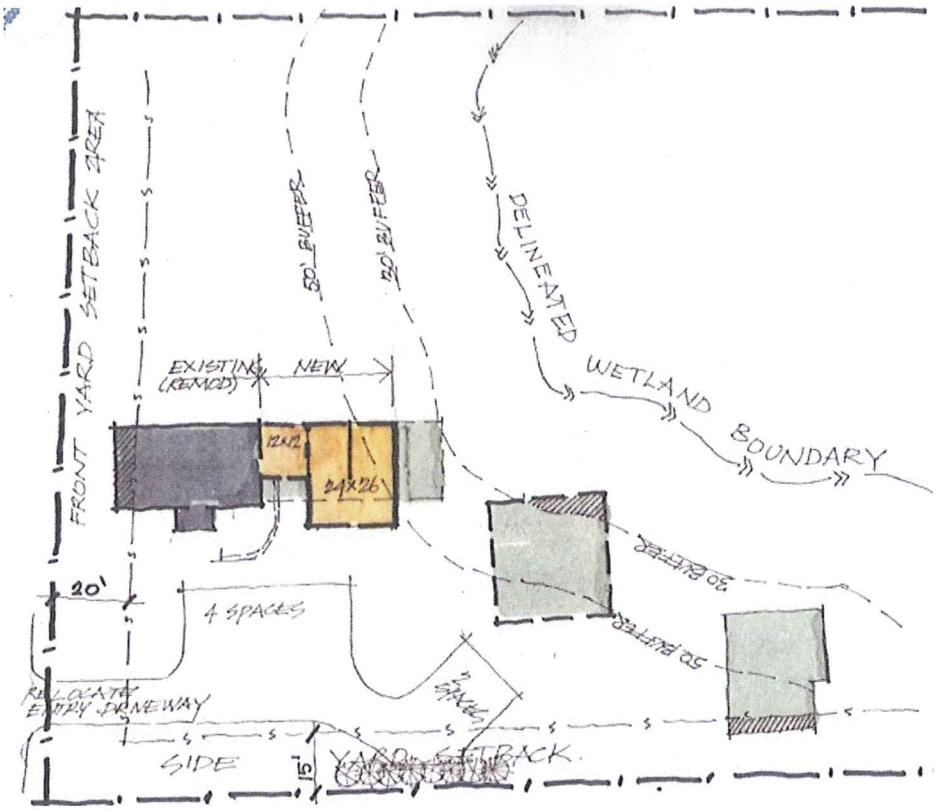


The floor structure in 60% of the floor area over which it is laid is completely collapsing and/or decayed.

Ryan Hellwig PE in his structural review of the buildings on the site (attached as Appendix B) concludes as follows: "The barn is in such bad shape that it would cost more money to save them than to tear it down and build new to better suit the proposed use".
(See Appendix G for further photographs of these existing conditions)

MODIFICATIONS NECESSARY FOR HOUSE TO BECOME A DUPLEX RESIDENCE

A balanced appraisal between the existing condition of the building and the historic significance of the structure suggests that the best course of action for an historically appropriate renovation of the building for two units of affordable housing would be to focus on preserving the existing frame structure and enclosure of the main portion of the house, and to develop this 2-story 1,620 S.F. structure as a single, 3-bedroom unit and to construct a new, attached 2 or 3-bedroom unit to the east, within the footprints of the existing "ell" and garage.



This seems the most feasible direction, if the intent is to retain the most historically significant feature of the existing building, because:

a. Containing a single 2-story unit within the existing framed portion allows the preservation of the frame without compromise to any horizontal or vertical fire separation that would be necessary, should we seek to divide the building either horizontally or vertically within the existing frame.
b. This portion of the building (1,620 S.F.) is not large enough to accommodate two dwelling units – even two small units – without further addition.

c. A vertical fire separation between units is far preferable to a horizontal separation. It is easier to achieve - unbroken by vertical penetrations, and it is less expensive as there is less area.
d. The vertical separation creates equality between units – each having a front entry at grade, each has direct access to outdoor space, each has a second story bedroom potential, and there are no costly or unmet sound separation challenges of footfalls of the upper residents annoying those below.

Therefore, the renovation construction to achieve this would proceed as follows:

a. Complete demolition and partial salvage (as noted below) of the ell and garage.

b. Partial demolition of the main portion, including removal of windows and roof covering / shingles (but not sheathing).

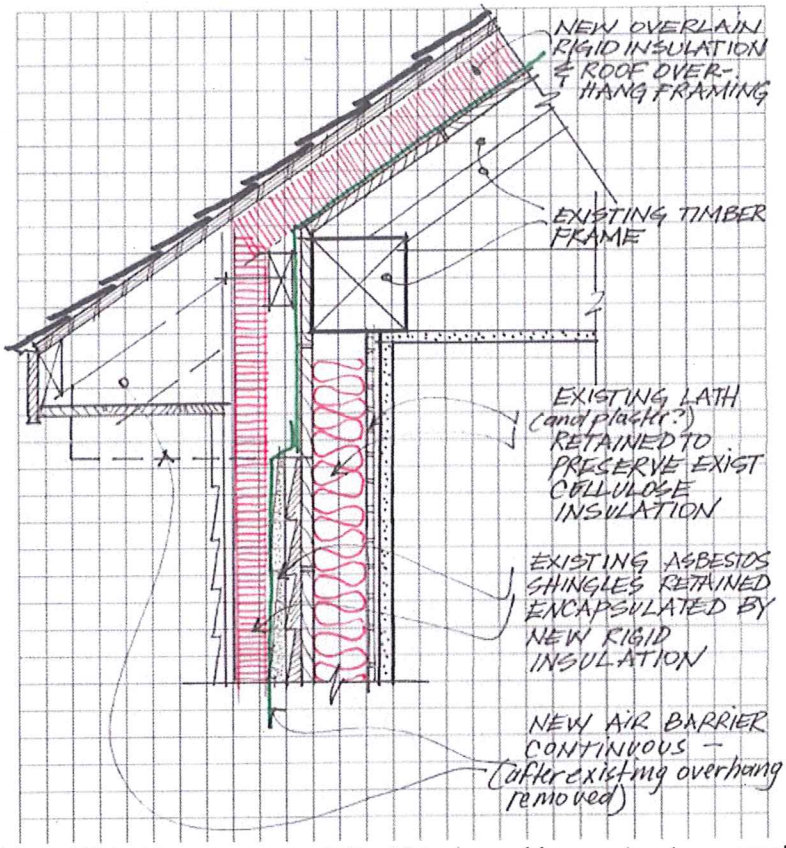
c. Cutting roof overhang back to the plane of the exterior wall.

d. Removal of all interior appliances, plumbing fittings, cabinets, interior doors, casing and lathe & plaster (from interior partition walls only).
   i. Note: We suggest retaining the lathe & plaster to exterior walls to contain the dense-pack cellulose, which seems to have been effectively installed there and therefore has enduring value.
   ii. Note: We also suggest retaining the existing exterior asbestos shingle siding, and encapsulating this in an applied exterior foam rigid insulation – i.e., "wrap & strap". Permanent encapsulation may be the most cost effective way of dealing with this hazardous material.

e. Lift the house as necessary to remove and replace the existing foundation and first floor structure, and then replace the existing structure on the new foundation.

Lifting to enable a installation of a new foundation can be undertaken in either of two ways as shown above — lifting the whole structure by crane and putting "aside" (probably on the footprint of the demolished exist barn), or jacking the structure up sufficiently to remove and re-install a foundation wall then lower and re-setting the structure.

f. With new first floor structure and foundation integrated with the existing frame / sheathing / siding enclosure, add 3½" (or 5½") of rigid insulation (either EPS or polyisocyanurate depending on desired R-value) over the existing roof sheathing boards. Incorporate 2x4 (or 2 x 6) overhang gable fascia assembly as shown below and apply new OSB sheathing over entire roof plane, coupled with roof underlayment and new roofing material (assume 30-year asphalt shingles).



Note: With this arrangement, the historic roof frame structure remains completely exposed. There is little value in attempting to put insulation between the existing rafters, since at 3" x 4", they have little useful depth for this purpose.

g. Install fascia, rake, soffit trim and any necessary guttering and downspout.

h. Stiffen the existing primary roof structure – main rafters & purlins. The best way to achieve this is to install a continuous LVL (say a double 1 3/4" x 9" beam) directly under and below the purlin. This new LVL will be supported at the exterior walls and below each of the two rafter beams — these latter can be supported by load bearing partitions below the rafters and lateral "summer" beams all the way down to the new first floor/basement columns.

Care will need to be taken to off-set the present eccentric loading since the existing partition are not centered under the beams.

i. Fully encase exterior in 2" rigid polyiso. insulation, secured with vertical 1x4 strapping, window openings formed and flashed for window installation.

j. Install new windows & exterior doors.

k. Insulation in new first floor plane, or insulation at basement walls (Note: C&H typically recommends the latter, to create the basement as a more useful space, particularly for mechanical equipment – and to avoid heat loss through partially or un-insulated ducts & piping running through unheated space.

l. Install new siding over the furring. (What might this be? perhaps vinyl, but preferably painted fiber cement lap siding and corner boards.)

m. Finish interior space to achieve 3-bedroom, 1½-bathroom, living and kitchen space enclosure within the space contained by the historic frame. Note – some interior walls may remain, depending on the layout and room sizes achieved. (See below for a diagrammatic potential floor plan to be the basis for this cost estimate for interior finish – GWB walls, doors, trim, base and finished floors, etc.

n. Assume 2nd floor finishing retains the existing wide-board flooring, sanded & refinished. Note 1: Assume 10% of this wide board flooring needs to be patched or replaced due to plumbing and/or duct penetrations, etc. Note 2: the retention of these board would require their abatement of lead paint.

o. Completely new electrical service – main panel, wiring, power, lighting, smoke alarms.

p. Completely new plumbing (waste & supply pipes) – waste to existing sewer line leaving the house, water supply from existing water entry, fixtures, faucets, and water heater. Assume electric resistance 50-gallon storage water heater.

q. New mechanical system – consider a pair of Fujitsu air-sourced heat pump units with one indoor cassette mounted on each of the first & second floors. (Note: The insulation & air sealing described above would reduce the heat load to well within the capacity of a couple of small units such as these.

MODIFICATIONS NECESSARY FOR BARN TO BECOME A SINGLE-FAMILY RESIDENCE

The existing barn building is beyond redemption. The modifications required to (support) the creation of a single family dwelling unit would be the complete demolition and replacement with new construction on the same footprint — because the wetlands proximity will require the constraint to maintain construction within the existing footprint. Therefore it is not practical to imagine that this building can be the subject of a "barn conversion" within the constraint of the current by-law.

It is also not possible, within the constraints of the Wetlands Protection Act and the constraints of the acquisition of the Hawthorne Meadow farm property, to expect to create a second buildable lot to overcome/circumvent the "barn conversion" restriction.
The frontage requirement in the RN zone is 120 feet. The frontage along East Pleasant Street is 206 feet, or 34 feet short of that required to support two frontage lots. It is possible to imagine creating a second lot as a flag lot with a 40 feet frontage on East Pleasant Street, but the lot area required — exclusive of wetland — is not achievable with the transecting wetland located as it is without extending the lot well into the upland beyond, which, under the terms of the CPA and Town Meeting authorization, is restricted to recreational use.

CONSTRUCTION COST ESTIMATES

Construction cost estimates have been prepared by Steve Ferrari (FM Smart Build Inc.) for the renovation and new construction scenarios stipulated in the original Request for Quotes. The basic cost projections have been summarized in the table below. Cost estimates, line-itemized by principal work-scope division, for each major scenario are included as Appendices E1, E2, and E3.

The cost estimates have been reported according to the Task 4 — Cost Estimates as set out in the original Request for Quotes. However, we have concluded that there is no practical difference between "historically appropriate" and "predominantly new" as these phrases apply to the situation that is found at 235 East Pleasant Street. Accordingly, we have provided a single scenario and estimate to cover both.

The structure of the estimates is as follows:
Appendix E1 — is for the demolition of all but the two story portion of the farmhouse; its preparation, lifting, and installation of a new foundation wall and first floor structure; and then a complete renovation saving (and completely exposing in the attic) the original timber frame and wide-board flooring on the upper story, though none of the existing doors or windows or interior stair (none of which appear to be original)
Appendix E2 — is for the construction of a completely new unit in association with the above renovation.
Appendix E3 — is for the construction of a completely new unit in place of the existing farmhouse. This estimate includes items such as demolition and site preparation, utilities, not included in E2.

Both the all-new option and the renovation-with-new option include a 200 sq. ft. single story linking structure that is intended to provide shared storage as well as separate the two dwelling units. It creates what might be termed a "cottage duplex" in which the dwelling units are defined as distinct entities, and for which daylighting and ventilation are available for the full perimeter of the upper (bedroom) floors. This $26,500 expense could however be eliminated if the aesthetic or storage value was considered dispensable.

Cost estimate summary table

Scenario	Cost per unit area	Total cost	Comments
Rehabilitation and historically appropriate restoration of the house as an affordable 2-family residence. 2-story 1,620 S.F. structure as a single, 3-bedroom unit and to construct a new, attached 3-bedroom unit to the east			
Selective demolition; house lifting; removal and replacement of first floor and foundation; replacing building.	$51	$76,000	Extracted from Appendix E1
Renovation of 1,620 s.f. exist structure.	$155	$251,000	Extracted from Appendix E1
New construction of second unit 1,400 Sq. ft. (assuming 150 s.f. of the basement is habitable).	$148	$207,200	See Appendix E2
Single story link/entry structure		$26,500	
Site work — utilities, paving, retaining wall, landscaping	Not Applicable	$60,700	Extracted from Appendix E1
Total Cost for Reno/New combination	$191	**$621,400**	
Construction of a predominantly new affordable duplex residence, with reuse of historically significant salvage material.	It was judged that there was no significant difference between this approach and that dealt with above.		
Construction of an entirely new duplex. Two, two-story 24' x 26' units @1,400 sq. ft. each (assuming 150 s.f. portion of each basement is habitable)	$175	$491,000	See Appendix E3 ($284,000) for the first of the new units and Appendix E2 ($207,000) for the second
Single story link/entry structure		$26,500	
Total Cost for Entirely New		**$517,500**	
Salvage of historically important components of the existing building— by moving the historic frame portion of the building to another site	Not Applicable	$40,000 to $60,000 to move the house to a new location — NIC new foundation, sitework etc.	The frame and the flooring boards are the only components of independent historic value remaining. Moving is the best solution to a partial salvation. See Appendix F
Removal of hazardous materials, waste storage & holding fees involved.	Not Applicable	(Insert $$)	Completed by Town prior to sale of parcel to preferred developer
Demolition of buildings and creating a construction ready building site.	Not Applicable	$25,000 to $30,000	

RECOMMENDATIONS

1. To make the property more appealing to aspiring developers — that the Town initiate the clean up of hazardous waste material reported/verified to be present on the site. (This with the exception of the asbestos impregnated siding shingles — if recommendation #4 below is accepted and pursued — in which case we expect this hazardous material can be effectively encapsulated behind the encasing/wrapping rigid insulation.

2. To avoid exacerbating an existing non-conformity in relation to abutting wetlands — that the entire development (whether a restoration of existing or built entirely new) be constrained to the existing built-over footprint.

3. To enable a third dwelling unit — a single-family, detached house in place of the existing but terminally dilapidated barn building — that the Town amend or expand the current portion of the Town Zoning By-Law Article that restricts a barn conversion to a dwelling unit to retain the existing exterior structure and cladding. This amendment could take the form of a second paragraph enabling a "reconstruction" rather than a "conversion" of an existing barn building pre-dating 1960. The Town may choose to constrain a "reconstruction" to occur either "within the existing volumetric envelope" (rather than just the existing footprint), and perhaps require replication of an exact rendition of the existing envelope so far as shape and volume are concerned, but allowing complete flexibility for interior spatial arrangement and window and door placement.

4. If it is decided to preserve the historically significant portion of the existing house and renovate to create two units of affordable housing:
    a. That the entire volume of the historically framed portion of the house be dedicated to one three-bedroom unit of the intended duplex, and that the "ell" and garage be completely demolished to make way for a new, attached two or three bedroom dwelling unit.

    b. That the existing foundation walls and existing first floor framing of the house be entirely replaced — and likewise all existing doors and windows; plumbing, electrical, and mechanical fixtures and equipment; and interior finishes and fittings (except as specifically noted below).

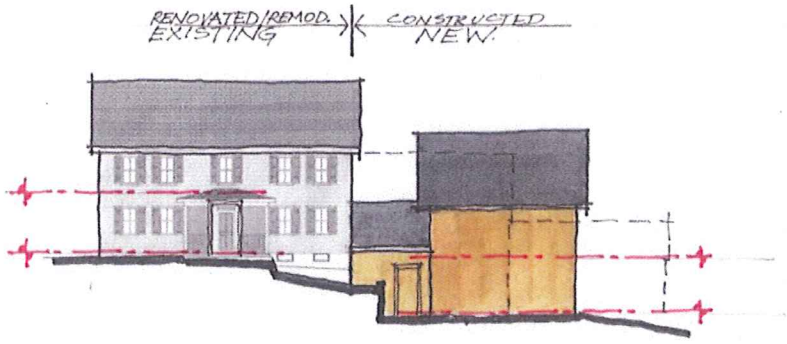
    c. That the existing asbestos shingle siding be retained and encapsulated behind a continuous wrap of rigid insulation strapped to the existing wall sheathing.

    d. That the existing roof overhang be removed back to the plane of the exterior wall, and the existing roof sheathing be

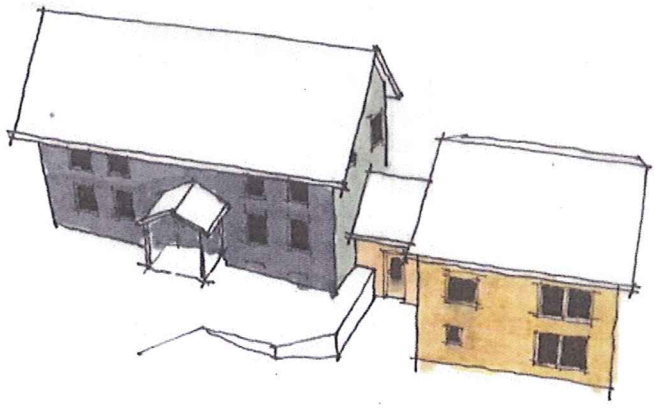
over-lain by structural insulated panels (SIPs) of equivalent thickness to the present overhang and extended to reinstate the overhang.

e. That the present interior lath-and-plaster on the interior of the exterior walls be retained so as to preserve the existing dense-packed cellulose insulation in the 4" cavity intact.

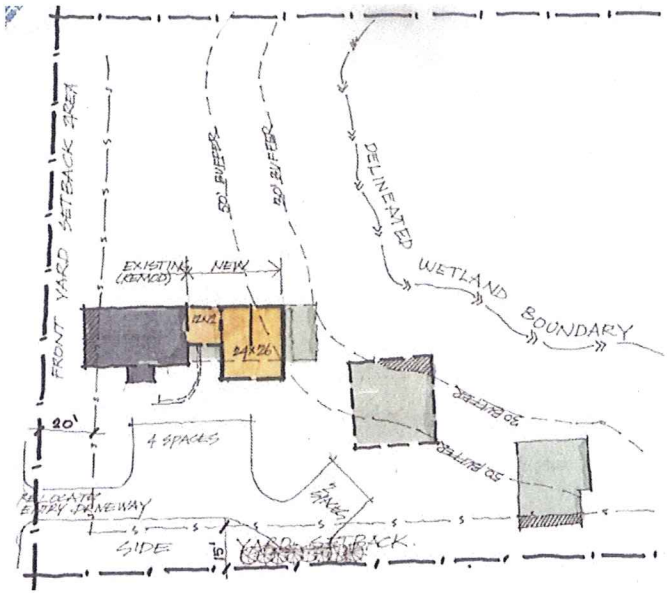
f. That the constructed new second dwelling unit be designed to have its main floor level a story below the main level of the restored/remodeled unit so as to retain the original massing as closely as possible — keeping the "little house" behind the "big house".



The front unit is the retained structure renovated as a two story, three bedroom unit whereas the rear is an attached, new two story slab-on-grade construction with a single story linking entry. The basement under the renovated existing portion of the duplex could be shared, or (more likely) dedicated to the unit above.



The massing is a reflection of the existing but with a single story linking structure that is can be an entry for the new unit (or a shared storage provision for both units) and that will aid sound separation and improve natural lighting the upper (bedroom) stories of each unit. Roof planes continue to have a predominantly southern exposure.



The smaller, newly constructed unit is pulled back from the wetland buffer and extended slightly to the south in compensation — the diagram shows the new portion of the duplex as a 24 x 26 footprint which, with the dedicated entry link, tallies to a unit size of approx. 1,400 sq. ft.

5. <u>If it is decided to forego the restoration of the existing buildings and build new</u>:
    a. That the Town find a buyer for the house —a buyer who will move historically framed portion to a new location.

    b. That the Town consider an incentive payment (a portion of the sum saved by the decision not to undertake an appropriately historic renovation in conjunction with creating the affordable housing) to encourage the commitment of such a buyer.

    c. That the community-of-interest that has gathered in support of preserving this building be effectively engaged in the search for a buyer and for a relocation site.

    d. That the Town entertain whatever tree pruning along the eventual route that is necessary to enable safe transport.

6. <u>If it is decided to forego the restoration of the existing buildings and build new</u>:
    a. That the new duplexed dwelling units each be two-story on the existing footprint — or even reduced and pulled back

from the abutting wetland boundary to the degree possible.

b. That the new massing closely conform to the present massing — with the eastern dwelling unit be designed to have its main floor level a story below the main level of the western, and that the two units be attenuated along an east-west axis perpendicular to the main road, unit so as to retain the original massing as closely as possible — keeping the "little house" behind the "big house".

c. That the south-facing roof planes be created clear of all obstructions (flues, VTRs, dormers, etc.) so as to be ready for future solar conversion panels.
[Note: this regardless of the continued presence of the large and apparently healthy existing shade tree; the building will out-last the tree, and the buildings should be prepared for their life in the post-petroleum resource economy).

d. That relocation of the entry driveway approximately 30 feet to the south be considered. This allows the resident parking to be put between the dwelling units and the shared driveway.